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Title : AN ADAPTIVE APPROACH TO MORPHOLOGICAL DIFFERENTIATION OF DORSAL FINS IN BOTTLENOSE DOLPHIN (Tursiops truncatus) POPULATIONS FROM MEXICAN COASTS

Category : Ecology

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Abstract : The flexible behavior and adaptability of bottlenose dolphins allows them to use different habitat types. This facilitates demographical differentiation among populations. Due to their wide distribution, the genus Tursiops presents high levels of phenotypic plasticity and its morphology can change abruptly in regions of high proximity. However, most researchers support Tursiops truncatus as a single species with a great variety of eco-phenotypes. A number of studies have found geographically structured morphological differences among dolphin populations, and some of these have been found to be associated to genetic differentiation. Fin shape in marine organisms has been used to describe physiological adaptations to different environmental conditions. We used this morphological feature to test population discreteness for bottlenose dolphins within the Mexican coasts. Several dorsal fin measurements were digitally computed from photographs of at least 40 different individuals at each locality. We computed measurement ratios, and assessed phenotypic variability and cluster formation through multivariate tests. Photographic quality was critical for the analyses; therefore, dorsal fins in the photographs had to be completely exposed, non-parallaxed and with non-aberrant morphology (major scars, nicks or notches). Samples were randomly selected from larger databases using animals previously judged to be adults. Statistical differences were found among populations ($p<0.05$). We discuss three hypotheses to explain dissimilarities based on physiology, anatomy and genetics. Response to thermal stress can range from physiological (restraining blood flux and preserving heat through blubber) to behavioral (enduring sea surface time) and adaptive (increasing body size and/or thermal exchange surface in flippers and dorsal fin). We developed a hydrodynamic model based on functionality of dorsal fin, such that different fin types could change stability and maneuverability according to differences in coastal wave regimes and available prey items. The morphological differentiation may also be explained in terms of possible geographic isolation and/or behavioral boundaries.